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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/579,087	05/12/2006	Seong Won Lee	CU-4808 WWP	6344

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EXAMINER

DRENNAN, BARRY T

ART UNIT	PAPER NUMBER
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4133

MAIL DATE	DELIVERY MODE
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11/19/2008

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/579,087	LEE ET AL.	
	Examiner	Art Unit	
	Barry Drennan	4133	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 July 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-5 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 12 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>8/18/2006</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The amendment filed 7 July 2006 has been entered. Accordingly, claims 1-5 are pending in this application.

Requirement for Information

2. Applicant and the assignee of this application are required under 37 CFR 1.105 to provide the following information that the examiner has determined is reasonably necessary to the examination of this application.

3. In response to this requirement, please provide a copy of the reference "AT 4022 Noise Master II Reference Manual." This reference was cited in a publication authored by Applicants (Lee, S-W., cited below) that is drawn to the claimed invention, and is believed by Examiner to be relevant to the patentability of the claimed invention.

4. Furthermore, in response to this requirement, please provide copies of each publication which any of the applicants authored or co-authored and which describe the disclosed subject matter of the "mean-variance filter" described in claim 1 or of the mathematical function described in claim 3.

5. In addition, in response to this requirement, please provide answers to the following interrogatory eliciting factual information:

The reference cited below (Lee, S-W., et al., "Noise-adaptive spatio-temporal filter for real-time noise removal in low light level images"), authored by Applicants and directed to the claimed invention, includes equation 7, which differs slightly from the

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mathematical formula in claim 3 of the present application. Which of these is in error: the cited reference, the present application, or both?

6. In responding to those requirements that require copies of documents, where the document is a bound text or a single article over 50 pages, the requirement may be met by providing copies of those pages that provide the particular subject matter indicated in the requirement, or where such subject matter is not indicated, the subject matter found in applicant's disclosure.

The fee and certification requirements of 37 CFR 1.97 are waived for those documents submitted in reply to this requirement. This waiver extends only to those documents within the scope of this requirement under 37 CFR 1.105 that are included in the applicant's first complete communication responding to this requirement. Any supplemental replies subsequent to the first communication responding to this requirement and any information disclosures beyond the scope of this requirement under 37 CFR 1.105 are subject to the fee and certification requirements of 37 CFR 1.97.

The applicant is reminded that the reply to this requirement must be made with candor and good faith under 37 CFR 1.56. Where the applicant does not have or cannot readily obtain an item of required information, a statement that the item is unknown or cannot be readily obtained may be accepted as a complete reply to the requirement for that item.

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This requirement is an attachment of the enclosed Office action. A complete reply to the enclosed Office action must include a complete reply to this requirement. The time period for reply to this requirement coincides with the time period for reply to the enclosed Office action.

Priority

7. This application claims benefit as a national stage application of PCT/KR05/02742 filed under the Patent Cooperation Treaty, filed 19 October 2005. This application also claims priority of KR 10-2004-0067615, filed in the Republic of Korea on 26 August 2004.

Specification

8. The title of the invention is not descriptive. A new title is required that is clearly indicative of the invention to which the claims are directed.

The following title is suggested: "Detection and removal of impulsive noise from an image via median filter and mean-variance filter".

9. The disclosure is objected to because of the following informalities: The typeface and size of the text renders the text difficult to read or to scan in and recognize by computer in equations 2 through 7, as well as at page 4 lines 14-15, page 5 lines 20 and 30, and page 14 line 1. Appropriate correction is required.

Claim Objections

10. Claims 2 and 3 are objected to because of the following informalities: The typeface and size of the text renders the text difficult to read or to scan in and recognize by computer in the mathematical expressions occurring in these claims. Appropriate correction is required.

Claim Rejections - 35 USC § 101

11. 35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

12. Claims 1-3 are rejected under 35 U.S.C. 101 because they do not fall within one of the four statutory categories of invention. While the claims recite a series of steps or acts to be performed, a statutory “process” under 35 U.S.C. 101 must (1) be tied to another statutory category (such as a particular apparatus), or (2) transform underlying subject matter (such as an article or material) to a different state or thing. The instant claims neither transform underlying subject matter nor positively tie to another statutory category that accomplishes the claimed method steps, and therefore do not qualify as a statutory process. In order for a process to be “tied” to another statutory category, the structure of another statutory category should be positively recited in a step or steps significant to the basic inventive concept, and not just in association with statements of intended use or purpose, insignificant pre- or post-solution activity, or implicitly.

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13. Claim 4 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. The embodiments described in the specification for the "computer readable medium recording a program" include "a transmission medium such as optical or metallic lines, wave guides, etc." (page 15 line 31 through page 16 line 2), thus causing the full scope of the claim to include non-statutory subject matter ("A transitory, propagating signal... is not a process, machine, manufacture, or composition of matter." In re Nujiten, 84 USPQ2d 1495 (Fed. Cir. 2007)).

14. Claim 5 is rejected under 35 U.S.C. 101 because the claimed invention is directed to non-statutory subject matter. While the claim defines a "system", the claim does not recite any corresponding structure for a physical apparatus. Furthermore, the specification indicates that the invention may be embodied as pure software (page 16), i.e., a set of software modules executed by a general-purpose computer.

Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 1, 2, 4, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Sohn, K., et al. ("Impulsive noise filtering based on noise detection in corrupted

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digital color images," Circuits, Systems, and Signal Processing, Vol. 20 No. 6, pp. 643-654, published November 2001, hereinafter Sohn) and further in view of Fang et al., U.S. Patent 5,771,318 (issued 23 June 1998, hereinafter Fang).

17. With respect to claim 1, Sohn discloses dividing the image into predetermined unit areas (Eq. 1), calculating a threshold using values of pixels in the unit area (Eq. 4), detecting whether impulsive noise exists in the unit area via the threshold (Eq. 4), and applying a median filter to the pixel (section 2.1, last paragraph). Sohn does not disclose applying a mean-variance filter to pixels next to the pixel where the median filter is applied.

However, Fang discloses the use of a mean-variance filter (col. 3 lines 19-30), and one of ordinary skill in the art would understand that additional noise in the region of a pixel containing impulsive noise would need to be removed by applying a filter to the surrounding pixels.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the technique of Sohn with the technique of Fang, motivated by the need to remove noise from an image while preserving edge regions in the image (Fang, col. 3 lines 1-6).

18. With respect to claim 2, Sohn further discloses calculating the noise detection threshold through the equation $I_{th} = \alpha + \log_2(x_m)$, with α being a minimum noise threshold and x_m being the mean value of pixels in the unit area (Eq. 4).

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19. Claims 4 and 5 are rejected for the same reasons set forth for the corresponding method in claim 1.

Conclusion

20. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Campanelli et al., U.S. Patent 5,768,440.

Karanovic, M., U.S. Patent 6,295,382 B1.

Rangayyan, R.M., et al. (July 1998) "Adaptive-neighborhood filtering of images corrupted by signal-dependent noise." Applied Optics, Vol. 37 No. 20, pp. 4477-4487.

Lee, S-W., et al. (May 2005) "Noise-adaptive spatio-temporal filter for real-time noise removal in low light level images." IEEE Trans. on Consumer Electronics, Vol. 51 No. 2, pp. 648-653.

Lee, S-W., et al. (January 2005) "Segmentation-based adaptive spatio-temporal filtering for noise canceling and MPEG pre-processing." Int'l Conf. on Consumer Electronics 2005, pp. 359-360.

21. This Office action has an attached requirement for information under 37 CFR 1.105. A complete reply to this Office action must include a complete reply to the attached requirement for information. The time period for reply to the attached requirement coincides with the time period for reply to this Office action.

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barry Drennan whose telephone number is 571-270-7262. The examiner can normally be reached on Monday through Thursday and alternate Fridays from 8:30am to 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Abul Azad can be reached on 571-272-7599. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Barry Drennan/
Examiner, Art Unit 4133

/ABUL AZAD/
Supervisory Patent Examiner, Art
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